



## **5G mobile technology**

Are businesses ready to seize the opportunity?

September 2018

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# Executive summary

5G is the latest development in mobile technology. 5G networks will deliver faster speeds, better reliability and improved capacity. The mobile industry internationally has now largely agreed the technical specifications for these networks, and trials are underway across Australia. In addition to bringing improved mobile experiences for consumers, 5G is expected to have a wide range of commercial applications.

These applications will bring significant economic benefits to Australia. Recent economic modelling suggests that, by 2030, 5G networks could be adding up to 0.2% to productivity every year. This would equate to between \$1,300 and \$2,000 in additional Gross Domestic Product (GDP) per person after the first decade of the rollout, or around **\$50 billion in additional GDP**.

Most Australian businesses recognise the potential benefits of 5G. In a new survey of over 550 business leaders, **more than three quarters (78%) say that faster, more reliable mobile telecommunications would benefit their business**. Most say that the most impactful benefit would be an increased ability to work remotely or flexible hours (20%) and better customer engagement (12%). Reinforcing these perceived benefits is the fact that nearly half (48%) of businesses say that they would be willing to pay at least 10% more than what they currently pay in order to have faster, more reliable mobile telecommunications.

Conversely, a significant share (46%) of businesses would not be willing to pay more for better mobile telecommunications. This suggests that many businesses are price-sensitive, and will not move to 5G until it is the same cost as 4G, or 4G plans are no longer available.

Four in every five Australian business leaders think that the adoption of new technologies is important in order to achieve business goals. As such, most business managers and owners expect to adopt 5G in the near future. **Over two thirds (69%) of employing businesses expect to be using 5G before the end of 2020**, while only 2% think that they will never use the next generation of mobile technology in their business. This is significant, considering the fact that technical specifications were only finalised this year.

Amongst other benefits, 5G will facilitate many emerging technologies – such as driverless cars, mobile payments, and remote monitoring and control. **Around 80% of businesses say that they have already implemented at least one emerging technology in their business, or that they expect to in the next three years**. This will contribute to significant growth in the digital economy in Australia, expected to be worth \$140 billion by 2020.

However, there are differing levels of readiness. More than one in ten (15%) businesses do not know what they will need to implement emerging technologies. Others identify a range of resources and support needs – including a further understanding of emerging technologies as well as their costs and benefits, a clear customer demand, and more skills and knowledge.

# 1 Digitally enabled businesses

Technology is critical for the day-to-day functioning of businesses. For example, 86% of businesses use technology for accounting, and 72% use it place orders with suppliers.<sup>1</sup> It can also be an important revenue channel; more than one quarter of Australian businesses receive half of their income online.<sup>2</sup>

Businesses are becoming increasingly digitally sophisticated. Those small to medium enterprises operating without a website or social media presence fell from 23% in 2016 to 11% in 2017.<sup>3</sup>

Meanwhile, business with increased levels of digitally engagement are more likely to be growing in revenue terms, and earn more revenue per employee.<sup>4</sup> Business leaders recognise the technology dividend. **Four in every five Australian business leaders think that adopting new technologies is important in order to achieve business goals.**

One of the enablers of many emerging technologies is 5G – the next generation of mobile technologies. 5G is the latest development in mobile technology since the first generation of mobile technology was developed in the 1980s. Once delivered, 5G will deliver faster speeds, better reliability and greater capacity for both individuals and businesses.

In this context, Telstra has engaged Deloitte to analyse the potential benefits of 5G to businesses and the broader economy. This report is based on a bespoke survey of over 550 Australian business leaders at director level and above (see the box below), as well as a review of relevant literature.

## Survey of business leaders

This document presents fresh insights about the readiness of Australian businesses for 5G mobile technology and their perceptions about its possible impacts, based on a bespoke survey of 558 Australian businesses.

The survey was fielded online by Research Now in August 2018. It included ten questions around the use and benefits of 5G, as well as adoption plans for selected emerging technologies.

Respondents to the survey were business leaders at director level or above. They represented a range of business sizes and industries.

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<sup>1</sup> Australian Bureau of Statistics (2017a)

<sup>2</sup> Australian Bureau of Statistics (2017a)

<sup>3</sup> Deloitte Access Economics (2017a)

<sup>4</sup> Deloitte Access Economics (2017a)

## 2 Next generation mobile

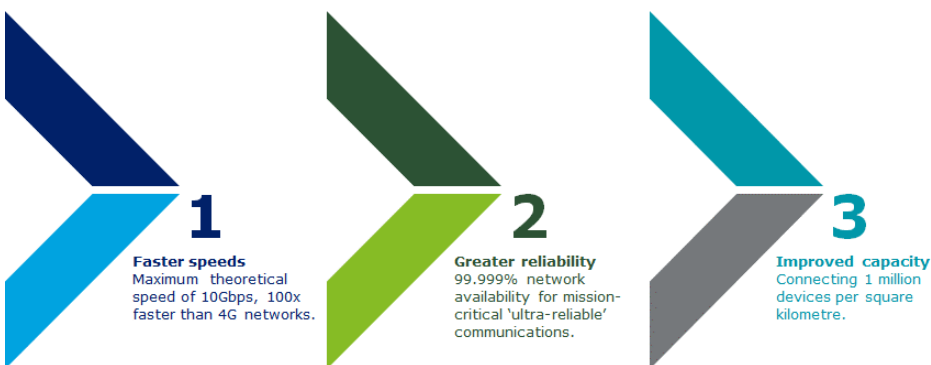
Mobile technology has become a part of everyday life for consumers and businesses. Australians now use their mobiles to navigate, do their banking and browse the internet. These daily activities all require using applications with an increasing amount of required data.

The need for more data is set to continue. Many emerging technologies rely increasingly on mobile networks. Their effectiveness and reliability will depend on their ability to be able to wirelessly transmit large amounts of data quickly and reliably.

The next stage for mobile networks, 5G or the fifth generation mobile network, will facilitate these needs. The mobile industry internationally has now largely agreed the technical specifications for these networks<sup>5</sup>, and trials are underway across Australia.<sup>6</sup> 5G networks will complement, rather than replace, existing 4G networks as well as fixed line networks.

5G networks will deliver faster speeds, better reliability and improved capacity. This will bring benefits for consumers and businesses, such as faster streaming, reduced latency and better network performance in peak times.

Figure 2.1: Faster speeds, better reliability and improved capacity



Source: Deloitte

### 2.1 Faster speeds

The speed of mobile networks refers to how quickly data can be downloaded or uploaded. Faster speeds mean less waiting time on internet-enabled mobile use, like downloading and uploading video.

5G networks are expected to significantly improve maximum speeds. For example, estimates suggest that 5G could offer maximum theoretical speeds of up to 10Gbps; more than 100 times the advertised speed for 4G networks in Australia of between 2-100Mbps.<sup>7</sup>

<sup>5</sup> 3GPP (2018)

<sup>6</sup> For example, see Telstra (2018a)

<sup>7</sup> ACMA (2016)

Recent trials suggest that 5G could offer significant improvements in speed. A Qualcomm simulation, for example, showed that for the median user, 5G applications had 7 times faster response rates for browsing, and 12 times faster download speeds.<sup>8</sup>

### 2.2 Greater reliability

Some mobile applications have the need for high levels of reliability – certainty that the network will always be on, with no outages. For example, a network outage could have significant consequences for driverless cars or drones that are operating on a network. 5G is expected to offer ultra-reliable service options, including 99.999% network availability for mission critical ‘ultra-reliable’ communications.<sup>9</sup>

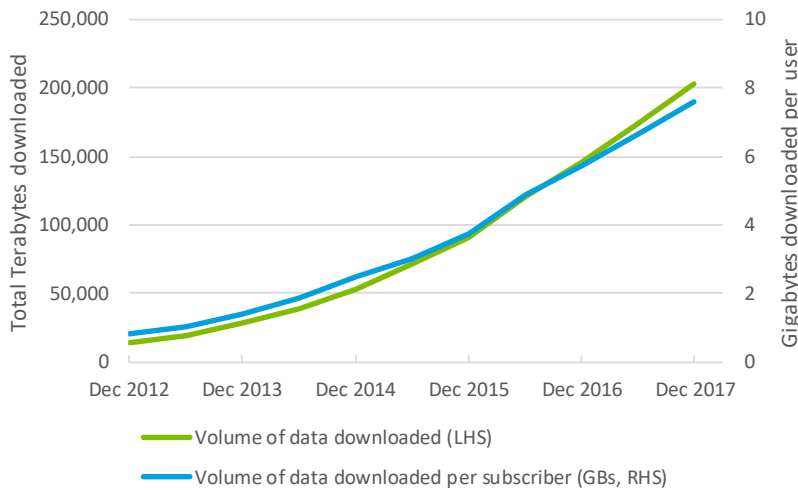
### 2.3 Improved capacity

In peak times and in areas with a high number of users, there can be network congestion, which can negatively affect performance. Given that there is an increasing number of devices and appetite for data, there is continuing pressure to ensure that there is sufficient capacity so that networks can simultaneously meet the demands of all subscribers.

The number of mobile devices in Australia continues to increase dramatically. There are around 27 million mobile handset subscribers, meaning there are 1.08 subscriptions per Australian.<sup>10</sup> This compares to 2012, when there were only 0.76 subscriptions per person.<sup>11</sup>

At the same time, the volumes of data downloaded on mobile handsets – both overall and on a per device basis – have continued to climb, as shown in Chart 2.2.

Chart 2.1: Volumes of data downloaded in a three month period, 2012-2017



Source: Australian Bureau of Statistics (2017b)

<sup>8</sup> Qualcomm (2017)

<sup>9</sup> ACMA (2016)

<sup>10</sup> Australian Bureau of Statistics (2017b)

<sup>11</sup> Australian Bureau of Statistics (2017b)

5G networks will utilise several spectrum bands, including those with higher frequencies. This will mean that it can support, at a minimum, 1 million connected devices per square kilometre.<sup>12</sup>

These networks will form part of the critical infrastructure businesses need in order to adopt new digital technologies. Faster speeds, greater reliability and improved capacity on mobile networks will support a greater range of commercial uses. Consider driverless cars, for example – though trials are already underway, having reliable networks will be critical for a broad rollout.

## Improving beach safety with Artificial Intelligence

Mobile technology is proving to be an important tool for not-for-profit organisations such as Surf Life Saving NSW.

Already, drones are being used by Surf Life Saving NSW to assist swimmers in need. After a swimmer in distress is identified, lifesavers can search the water at a height of 60 metres, moving at speeds of 50 kilometres an hour. Once the swimmer is located, the drones can then deploy inflatable floatation devices, so that swimmers can remain afloat and make it back to shore.

The project is a world first technology according to Surf Life Saving NSW unmanned aerial vehicles operations coordinator, Tom Caska. Tom said “There is no other lifesaving operation or organisation worldwide that is doing what we're doing on the size and scale that we're doing it.”

Only hours after being trialled, this technology was put into practice, rescuing two teenage boys in distress in the surf off a NSW beach in January 2018. The boys were 700 metres offshore in a swell of 3 metres. Within two minutes the drone had located the boys and dropped an inflatable floatation device to them.

5G technology will allow groups such as Surf Life Saving NSW to further improve their use of drones to assist saving lives on Australian beaches.

For example, in the current trials, lifesavers are manually identifying people at risk. With 5G networks, drones with object recognition capability could independently search for and locate a missing person. This could be someone struggling to return to the shore alone or someone unconscious in the water.

5G would also improve the practicality and potential scale of drone applications. It would provide the capacity and reliability to support the rollout of more drone technology to assist lifesavers, particularly in regional beaches. It would also allow the network connectivity to allow drones to cooperate safely in the same airspace as rescue helicopters.

Sources: Telstra Exchange 2018a, Rural and Regional Affairs and Transport References Committee (2018)

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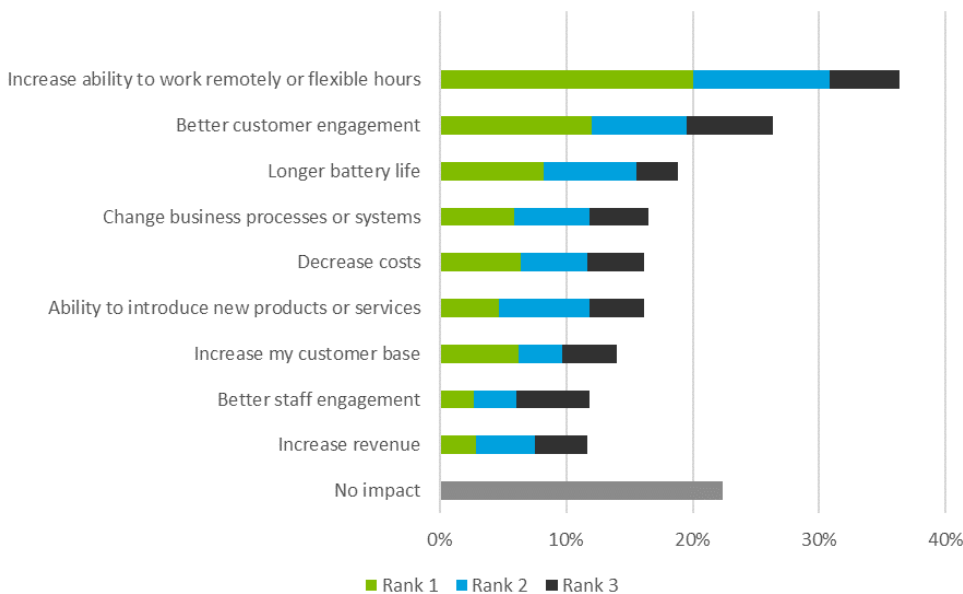
<sup>12</sup> International Telecommunication Union (2017)

# 3 What will 5G mean for businesses?

On top of the benefits for consumers, much of 5G’s value will come from enabling business to become more efficient. **Three quarters of surveyed businesses say that faster, more reliable telecommunications would benefit their business.** Improved telecommunications offers new ways for improving efficiency and productivity – for example, through process automation. For some businesses, the network could also enable innovation, supporting the development of new products, services and revenue streams.

When considering the specific benefits of faster and more reliable telecommunications, 12% of surveyed businesses ranked better customer engagement as the top benefit, and 6% thought that decrease costs would be the greatest benefit, as shown in Chart 3.1.

Chart 3.1 Benefits of 5G enabled technology



Source: Deloitte analysis based on data from Research Now

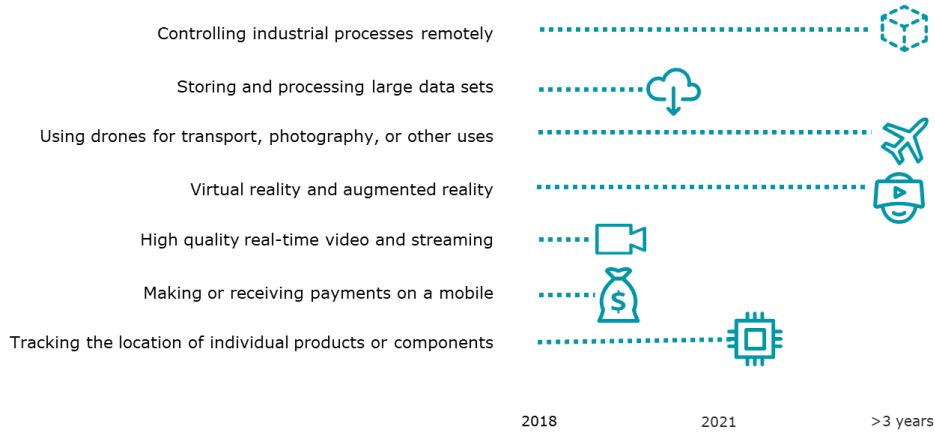
Most businesses are willing to pay for these benefits. Around half of those surveyed said that they would be willing to pay at least 10% more for mobile services in their business in order to have faster, more reliable mobile telecommunications.

On the other hand, an almost equal proportion were not willing to pay more. This may be, in part, because some businesses do not see the benefits of improved telecommunications. Nearly one quarter of surveyed businesses believe that improved mobile telecommunications will have no impact on their business.



This is despite a majority of businesses expecting to be using one or more forms of 5G enabled technology – including mobile payments, virtual reality or use of drones – in the medium term, as shown in Figure 3.1.

Figure 3.1: Median timeframe for adoption of 5G enabled technologies by business



Source: Deloitte analysis based on data from Research Now

Clearly, businesses expect to implement some applications faster than others. For example, mobile payments are already in use in many businesses, as pictured in Figure 3.1, whereas few expect to be using virtual and augmented reality in the medium term.

The speed of adoption may be partially a result of customer demand. For example, an estimated 72% of Australians shop on mobile,<sup>13</sup> and 35% of Australians say that they have used mobile payments in a store.<sup>14</sup> Meanwhile, regulatory considerations may slow the adoption of other technologies, such as drones.<sup>15</sup>

Another emerging technology set to transform businesses is the use of large data sets. Companies with data-driven strategies have above-average productivity and profits.<sup>16</sup> A Deloitte Access Economics analysis of over 50 machine learning applications using large data sets found that returns on investment were between two and five times the cost of implementation.<sup>17</sup>

**Around 80% of businesses say that they have already implemented at least one emerging technology shown above in their business, or that they expect to in the next three years.** This represents a significant shift for many Australian businesses. Only two years ago, 65% of businesses had no plans to adopt some of these emerging technologies such as artificial intelligence, virtual reality or augmented reality.<sup>18</sup>

<sup>13</sup> PayPal (2018)

<sup>14</sup> Deloitte (2017)

<sup>15</sup> Rural and regional affairs and transport references committee (2018)

<sup>16</sup> Steers (2018)

<sup>17</sup> Deloitte Access Economics (2017b)

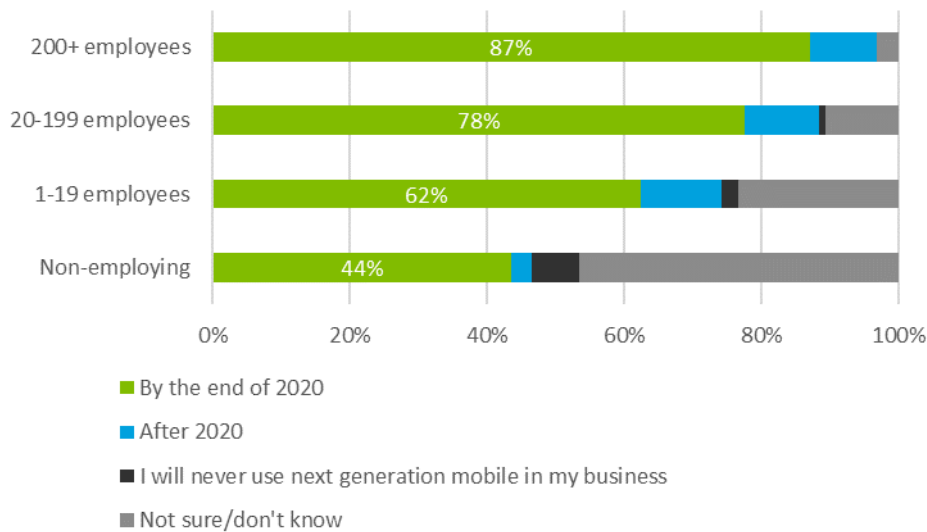
<sup>18</sup> Carr (2016)

# 4 Business readiness to adopt 5G

Most surveyed businesses know the next generation of mobile technology is coming. **Of employing businesses surveyed, 69% expect to be using 5G before the end of 2020.** Only 2% think they will never use the next generation of mobile technologies in their businesses.

Businesses larger in employment terms are more likely to think they will be adopting 5G earlier. For example, 87% of businesses with 200 or more employees think that they will have 5G by the end of 2020, compared to 62% of businesses with between 1-19 employees.

Chart 4.1: Take up of 5G technology by business size



Source: Deloitte analysis based on data from Research Now

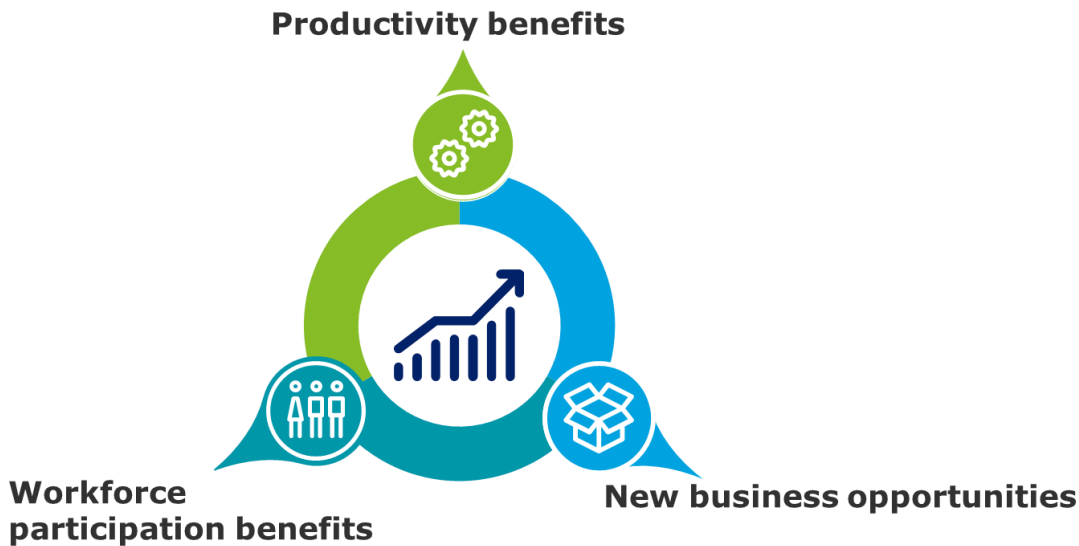
Businesses that believe technology is important to achieving their business goals are more likely to be fast adopters of 5G. For businesses that believe technology is important for achieving their business goals, 80% are expecting to be using 5G by 2019, compared to 5% of businesses that do not believe technology is not important for achieving their business goals.

# 5 Potential economic benefits of 5G

In addition to the potential benefits that 5G will bring to individual businesses and consumers, the new mobile network will contribute to broader economic benefits. The three main mechanisms through which 5G technology will contribute to economic growth in Australia include:

- increased productivity;
- increased workforce participation; and
- new business opportunities.

Figure 5.1: 5G technology drivers of economic growth



Source: Deloitte

## 5.1 Increased productivity

One of the key ways that 5G will provide economic benefits to Australia is through increasing productivity – the output that can be produced per unit of input. In 2015, Deloitte Access Economics estimated that the economy was 2.0% or \$34 billion larger than it would otherwise have been because of the long-term productivity benefits of mobile technologies.<sup>19</sup>

5G technology will add to this dividend. The Bureau of Communications and Arts Research (BCAR) estimated that the increased productivity associated with 5G technology could lead to an additional \$1,300 to \$2,000 in Gross Domestic Product (GDP) per person by 2030.<sup>20</sup> This represents a GDP increase of between \$32 billion and \$50 billion based on Australia's current population.

<sup>19</sup> Deloitte Access Economics (2016)

<sup>20</sup> BCAR (2017)

## Linfox improving driver safety with Internet of Things

Linfox is set to install Internet of Things (IoT) technology in its 5,000 truck fleet, with the goal of improving driver safety and the efficiency of its fleet.

The IoT solution will install tablets into each of Linfox's heavy vehicles. These tablets will collect and send data on key variables, such as real-time tracking of the location of goods, driver fatigue, vehicle condition, harsh braking and accelerating, and in-cabin readings of speed and distance.

This would enable drivers to access logbooks and complete safety checklists before they are on the road, improving efficiency. The data will also improve Linfox's ability to co-ordinate their drivers on major roads in Australia. Real-time data on heavy vehicle locations can be ultimately used to improve optimal routing options for other drivers by avoiding congested areas.

In addition, Linfox sees the sensors as playing an important role in improving driver safety. According to Linfox CIO, Conrad Harvey, "We are in a critical time in the logistics industry and it's important to deliver technology that will ensure greater safety for our drivers and communities."

Linfox is looking to use this technology to improve its customer service. The IoT can already provide real time tracking on the location of the good in transport. Linfox is now exploring the giving drivers access to Voice Assistants. These voice assistants would provide drivers the option to identify if they will be late and automatically alert customers. These advances seek to improve customer experiences with the company in the future.

Sources: Telstra 2018b, Telstra Exchange 2018b, Computerworld 2018

### 5.2 Increased participation

Mobile technology not only increases the productivity of workers, it enables more workers to join the labour force. It does so in three ways:

- by helping to overcome **locational barriers**, which can be prohibitive for those who live in remote areas, have difficulties with mobility or have caring responsibilities;
- by helping people to meet **other commitments** that would otherwise limit their ability to participate in the workforce, for example by allowing people to monitor health, check-in with family and friends and do household tasks while at work or in transit; and
- by enabling new ways for people to **find and apply for jobs**.

A 2015 survey found that, of people who less likely to be working full time, around 14% would work less hours if they couldn't work remotely, and 11% would work fewer hours if they couldn't meet personal commitments while at work.<sup>21</sup> In total, this meant that the cohorts surveyed worked on average 0.6 hours more every week because of mobile. This additional labour force participation was estimated to facilitate an additional **\$8.9 billion to GDP to the economy** in 2015.<sup>22</sup>

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<sup>21</sup> Deloitte Access Economics (2016)

<sup>22</sup> Deloitte Access Economics (2016)

## Gaining access to export markets with remote monitoring technology

Four years ago, it was impossible to export fresh milk products to China. Passing through Chinese quarantine took more than two weeks, which was more than the safe shelf life for fresh milk. This hindered the export potential of Australian farmers. Now Peloris is using mobile technology to help Australian farmers export fresh milk from Australia to customers in China, a journey over 7000 kilometres, in less than 5 days.

Peloris is using real time sensor technology so Australian farmers can access data in real time to assure the quality of their milk. It does this by monitoring the temperature of the milk through the entire journey; from the Australian Dairy to the customer in China. This visibility allows farmers and transport providers to react to real time developments.

The data can also be accessed in real time by China quarantine officials which has led to endorsement by China Customs for rapid border clearance for milk imports from Australia. This has made it possible to export this temperature and time-sensitive good despite the distance. As a result, Australian milk exports now account for over 50% of all fresh milk imports in China.

It also provides greater certainty for consumers. Chinese buyers can validate the provenance and quality of the fresh milk via the unique serialisation number embedded in each product bar code. This improves the confidence in the product and leads to increased demand for the Australian products.

Peloris is now looking at the possibilities of using 5G technology to develop other short shelf life products to be transported more quickly to China and new markets across Asia.

Sources: Telstra Exchange 2018, Computerworld 2018

### 5.3 New ways of creating value

5G technology could also enable new goods and services to be provided in Australia. For example, 5G allows the production and widespread use of autonomous vehicles or making the use of drones more feasible. Of course, some of these new activities will replace existing products or services. However, overall, more new products are expected to be created than the number of old products will be replaced.<sup>23</sup>

New technologies such as 5G can also enable new business models. Forecasts suggest that 5G could enable \$12.3 trillion of global sales activity by 2035 across multiple industry sectors. This represents about 4.6% of global real output in 2035.<sup>24</sup>

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<sup>23</sup> BCAR (2017)

<sup>24</sup> IHS Economics and IHS Technology (2017)

# 6 Overcoming barriers to using 5G

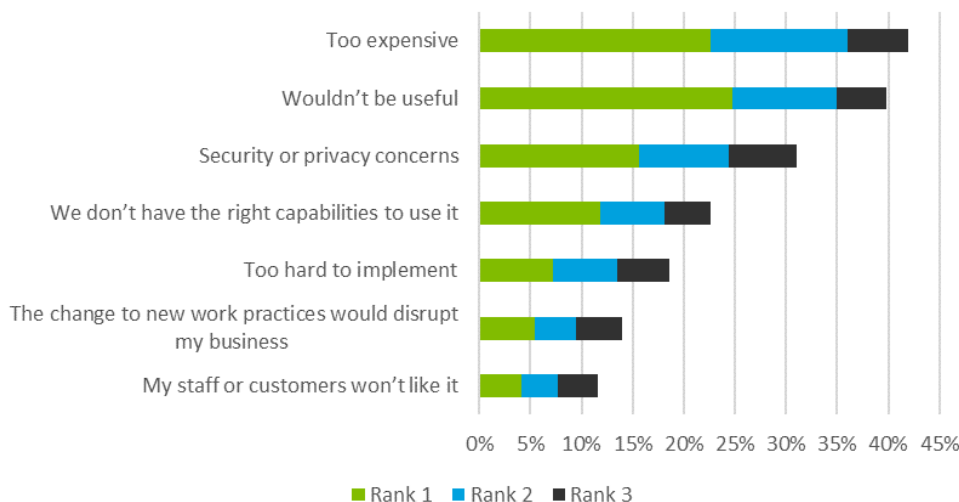
With potential benefits to be gained from 5G technology it's important to understand what businesses expect will prevent them from using this technology.

The most cited barrier for businesses potentially adopting emerging technologies is that it might be too expensive. Over 40% of businesses ranked this barrier within their top three concerns (see Chart 6.1). Similarly, our survey of businesses suggests that many businesses are price sensitive, with 46% saying that they would not be willing to pay more for faster, more reliable mobile telecommunications. These businesses would not move to 5G until it is the same costs as 4G, or 4G plans are no longer available.

There is also a significant proportion of businesses that are not convinced of the benefits of adopting emerging technologies. Our survey found that 40% of businesses believe that emerging technologies it would not be useful for their business.

The third most cited barrier to technology adoption is security or privacy concerns. As devices become increasingly connected there are concerns about the protection of business or personal data. The Commonwealth Government has reviewed the telecommunication companies that could provide the necessary infrastructure for 5G networks.<sup>25</sup>

Chart 6.1: Top 3 ranked barriers to adopting emerging technologies

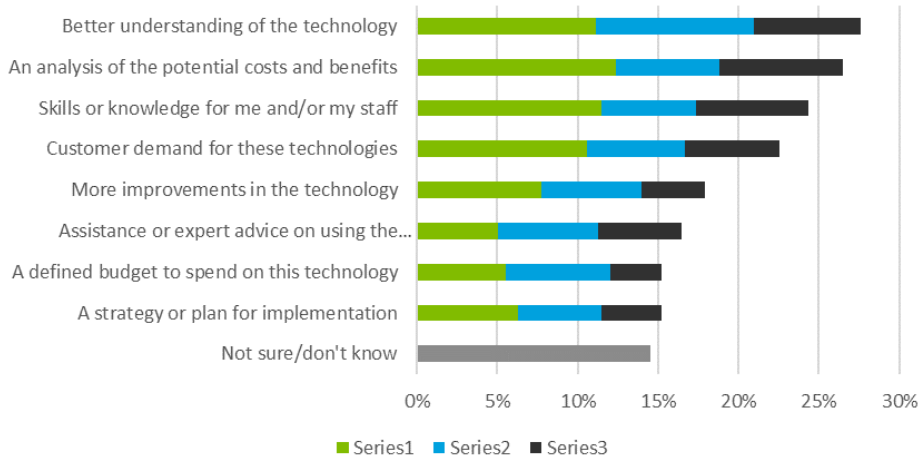


Source: Deloitte analysis based on data from Research Now

<sup>25</sup> Minister for Communications and the Arts (2018)

Practically, businesses saw that the best way to overcome these barriers would be through building knowledge. As shown in Chart 6.2, there are differing levels of knowledge among Australian businesses. More than one in ten (15%) do not know what they will need to implement emerging technologies.

Chart 6.2: Factors which would enable businesses to adopt emerging technologies



Source: Deloitte analysis based on data from Research Now

For the remaining businesses, Chart 6.2 shows the top three ranked enablers that would support businesses to adopt emerging technologies:

- more information about the technology itself;
- a better commercial understanding of the technology through the potential costs and benefits; and
- the skills and knowledge to use the technology.

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